

# Single-event Drag Modulated Aerocapture at Venus for a Small Satellite Science Mission

Completed Technology Project (2017 - 2019)



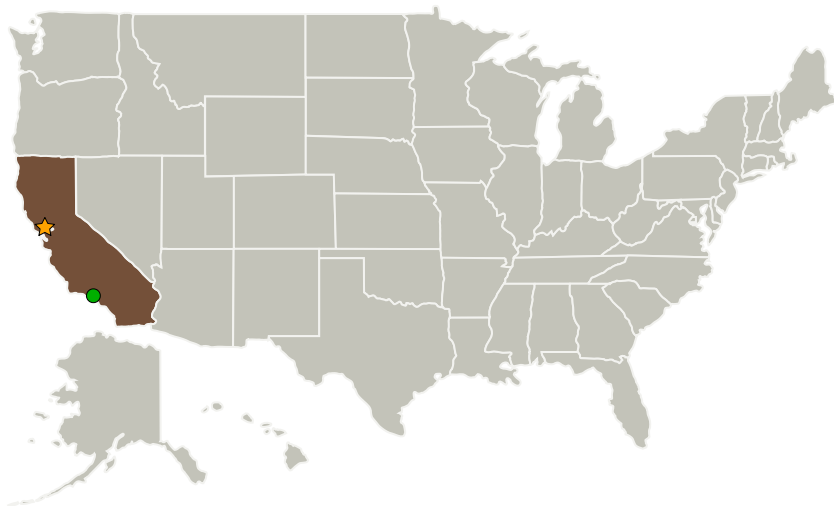
## Project Introduction

Perform up to 6 separate shots in the Ames Hypersonic Free-Flight Aerodynamic Facility. 2 sets of models will be tested, one model shape (see photo of pathfinder shapes below) will represent the body of revolution shape representing a rigid (non-deployable) drag skirt and the other model shape will have a drag skirt representative of an ADEPT-based shape using an 8-rib, 8-panel configuration.

## Anticipated Benefits

The goal is to enable a simple, single-event drag modulated aerocapture at Venus for a small satellite science mission. Aerocapture can significantly enhance orbital missions to Mars, Venus, Titan, Uranus, and Neptune. The use of aerocapture instead of propulsive orbit insertion can increase delivered payload by 15% at Mars, 70% at Venus, more than 200% at Titan and Uranus, and an estimated greater than 800% at Neptune. An alternative approach is aerocapture that employs drag instead of lift as a means to modulate the trajectory. Drag modulated aerocapture is a simple, scalable, and likely to be costeffective way to enhance planetary science missions. The focus of this proposal is to address some of the key entry technology challenges for the single-stage discrete-event architecture.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
University of Colorado Boulder	Supporting Organization	Academia	Boulder, Colorado

## Primary U.S. Work Locations

California

## Project Website:

[https://www.nasa.gov/directorates/spacetech/innovation\\_fund/index.html#.VC](https://www.nasa.gov/directorates/spacetech/innovation_fund/index.html#.VC)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Center / Facility:

Ames Research Center (ARC)

## Responsible Program:

Center Innovation Fund: ARC CIF

## Project Management

## Program Director:

Michael R Lapointe

## Program Manager:

Harry Partridge

## Principal Investigator:

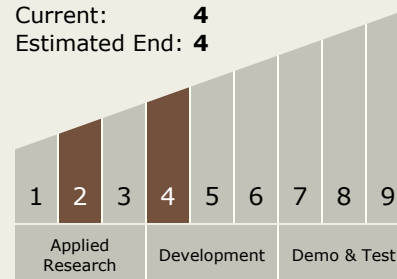
Paul Wercinski

## Technology Maturity (TRL)

Start: 2

Current: 4

Estimated End: 4



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## Technology Areas

### Primary:

- TX09 Entry, Descent, and Landing
  - └ TX09.1 Aeroassist and Atmospheric Entry
    - └ TX09.1.2 Hypersonic Decelerators

## Target Destination

Others Inside the Solar System